

## **Appendix A: Draft Environmental Assessment**

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# Draft Environmental Assessment

## *Minnesota Valley National Wildlife Refuge and Wetland Management District Comprehensive Conservation Plan*

### Chapter 1 – Purpose and Need

#### Purpose

The purpose of the proposed action is to specify a management direction for Minnesota Valley National Wildlife Refuge (Refuge) and Wetland Management District (District) for the next 15 years. This management direction will be described in detail through a set of goals, objectives, and strategies in a Comprehensive Conservation Plan.

The action is needed because adequate, long-term management direction does not exist for the refuge. Management is now guided by a Comprehensive Plan that was published in 1984 and by several general policies and short-term plans. Also, the action is needed to address current management issues and to satisfy the legislative mandates of the National Wildlife System Improvement Act of 1997, which requires the preparation of a Comprehensive Conservation Plan for all national wildlife refuges.

The purposes for the Refuge were established by Congress in 1976 through the Minnesota Valley National Wildlife Refuge Act (*Public Law 94-466; October 8, 1976*). In general, its purposes are to (1) provide habitat for a large number of migratory waterfowl, fish, and other wildlife species; (2) to provide environmental education, wildlife recreational opportunities, and interpretive programs for hundreds of thousands of Twin Cities residents; (3) to protect important natural resource areas from degradation; and to (4) protect the valley's unique social, educational, and environmental assets.

We prepared this Environmental Assessment (EA) using guidelines established under the National Environmental Policy Act of 1969. The Act requires us to examine the effects of proposed actions on the natural and human environment. In the following sections we describe four alternatives for future Refuge management, the environmental consequences of each alternative, and our preferred management direction. We designed each alternative as a reasonable mix of fish and wildlife habitat prescriptions and wildlife-dependent recreational opportunities, and then we selected our preferred alternative based on their environmental consequences and their ability to achieve the refuge's purpose.

#### Need for Action

The CCP ultimately derived from this EA will set the management direction for the Refuge and the District for the next 15 years. The Refuge is currently guided by a Master Plan published in 1984 and the District has no long-term management plan. Management actions are now mostly guided by general policies and short-term plans. This EA will present four management alternatives for the future of the Refuge and District. The preferred alternative will be selected based on its ability to meet identified goals. These goals may also be considered as the primary need for action. Goals for the

Refuge and District were developed by the planning team and encompass all aspects of Refuge and District management including public use, habitat management and maintenance operations. Each of the four management alternatives described in this EA will be able to at least minimally achieve these goals.

*Floodplain Forest:* To restore, protect, and maintain natural species diversity while emphasizing priority wildlife and plants characteristic of floodplain forests within the northern tallgrass prairie ecosystem.

*Wetlands:* To restore, protect, and maintain natural species diversity while emphasizing priority fish, wildlife and plants characteristic of wetlands within the northern tallgrass prairie ecosystem.

*Upland Forest:* To restore, protect, and maintain natural species diversity while emphasizing priority wildlife and plants characteristic of upland forests within the northern tallgrass prairie ecosystem.

*Grasslands and Oak Savanna:* To restore, protect, and maintain natural species diversity while emphasizing priority grassland-dependent wildlife and plants characteristic of the northern tallgrass prairie ecosystem.

*Land Protection:* To enhance the integrity of lands within the authorized boundary of the refuge and contribute to the protection and restoration of fish and wildlife habitats within the Minnesota River watershed.

*Public Use:* To provide high quality wildlife-dependent recreational and environmental education opportunities to a diverse audience. These activities will promote understanding, appreciation and support for Minnesota Valley National Wildlife Refuge and the Wetland Management District as well as the entire National Wildlife Refuge System.

## **Decision Framework**

The Regional Director for the Great Lakes-Big Rivers Region will need to make two decisions based on this EA: (1) select an alternative and (2) determine if the selected alternative is a major Federal action significantly affecting the quality of the human environment, thus requiring preparation of an Environmental Impact Statement. The planning team has recommended Alternative C to the Regional Director. The Draft CCP was developed for implementation based on this recommendation.

## **Authority, Legal Compliance, and Compatibility**

The National Wildlife Refuge System includes federal lands managed primarily to provide habitat for a diversity of fish, wildlife and plant species. National wildlife refuges are established under many different authorities and funding sources for a variety of purposes. The purposes for the Refuge were established by specific legislation and are listed in the previous section. The District's Waterfowl Production Areas are also part of the Refuge System and are acquired using receipts from the Migratory Bird Conservation Fund (Duck Stamp Fund).

Additional authority delegated by Congress, federal regulations, executive orders and several management plans guide the operation of the Refuge and Wetland District. The appendix of the Draft CCP contains a list of the key laws, orders and regulations that provide a framework for the proposed action.

## **Scoping of the Issues**

The planning process began in October 1998 when a team comprised of Service employees and a representative each from the Minnesota Department of Natural Resources and the Friends of the Minnesota Valley met to review the original Comprehensive or Master Plan (1984) and identify a number of issues and concerns that would likely affect the future of the Refuge and the District. The team agreed to a process for obtaining public input and for completion of the Refuge and District CCP. Public input was obtained using several methods including open houses, issue-based focus groups, public use surveys, and personal contacts. Please see Chapter 2 of the CCP for more detail on the scoping of issues.

### Issues and Concerns

An array of issues, concerns, and opportunities were addressed during the planning process. Numerous discussions among citizens, focus group participants, resource specialists, and Refuge planning staff brought to light several recurring themes. In general, themes centered on appropriate recreational uses, confusing rules and regulations on public lands in the valley, land protection and watershed activities, and maintenance of Refuge and District facilities. Some of the issues raised during internal and public scoping included:

- Degradation of Minnesota River Water Quality
- Land Use and Development Adjacent to Refuge
- Loss in Quality of Visitor Facilities
- Completion of the Minnesota Valley State Trail
- Control of Exotic/Invasive Plants
- Mountain Biking
- Horseback Riding
- Low Public Awareness of Refuge and Resource Protection Goals

A complete listing and further discussion of these issues and concerns can be found in Chapter 2 of the CCP and Chapter 2 of this EA.

## **Chapter 2 – Description of the Alternatives**

### **Formulation of Alternatives**

Four management alternatives were developed by the planning team based on issues, concerns and opportunities presented during the CCP scoping process. The issues that are discussed came from individuals, cooperating agencies, conservation organizations and Refuge staff. A summary of the four alternatives is provided in Table 1 on page 109.

The following four management alternatives were developed to generally fit within the current Refuge and Wetland District budget. In other words, the alternatives were formulated under the assumption that a large budget increase for refuge operations is unlikely during the life of the plan. If an alternative calls for one program to increase significantly in size or scope other refuge programs would need to be reduced. However, we did provide for the possibility of new private resources (volunteers, grant funds, etc.) and a modest refuge program and/or staff funding increase. In addition, the airport mitigation Trust Fund established in 2000 will be able to contribute toward land acquisition, new facilities and some program increases.

The four management alternatives were developed to address most of the issues, concerns and opportunities identified during the CCP planning process. Specific impacts of implementing each alternative will be examined in seven broad issue categories;

*Habitat:* What level of habitat restoration and maintenance is appropriate given funding constraints and desired future conditions?

*Fish, Wildlife and Plants:* How should we deal with the overpopulation of some wildlife species, such as carp, white-tailed deer and beaver, that can cause negative impacts to vegetation and habitat management capabilities? Can we protect critical migratory bird habitats, such as heron colonies and Bald Eagle nests? Will the proposed management scenario benefit natural biodiversity?

*Recreation:* What is the appropriate level of recreational activities on Refuge and District lands? Does the Refuge adequately meet the mandate to provide quality wildlife-dependent recreation?

*Secondary Recreational Uses:* What are appropriate non-wildlife dependent recreational activities on Refuge and District lands?

*Resource Threats:* What aspects of surrounding land uses threaten the integrity of ecological processes on the Refuge and Waterfowl Production Areas? What can the refuge do to control or reduce negative impacts?

*Land Protection:* Will the Refuge and District continue to grow and for what reasons? Can the Refuge, and the U.S. Fish and Wildlife Service, play a larger role in resource conservation in the Minnesota River watershed?

*Environmental Education:* Will the quality of environmental education, both on-site and through outreach, be improved in the future? How can the airport mitigation Refuge Trust Fund be used to replace lost opportunities and/or expand the environmental education program?

## **Alternative A. Public Use Emphasis**

This alternative would encourage a minimal approach to managing habitats while allowing for significantly more public recreational uses and an expanded environmental education program. Staff time, emphasis and resources would be shifted to allow for more public activities in all areas of the refuge. Additional wetlands, grasslands or oak savannas would not be restored on existing refuge lands. No land for Refuge units would be acquired outside of the current boundaries. Waterfowl Production Area acquisitions

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would proceed at current or reduced levels. Control of exotic plant or nuisance wildlife populations would be kept to a minimal and reactive level.

No new restrictions on recreational uses such as canoeing, horseback riding and mountain biking would occur under this alternative. The environmental education program could see a new visitor education facility, exhibits and interpretive materials. Additional staff and/or volunteers would be added in an effort to increase on-site public contacts throughout the Refuge.

Further site-specific detail, public involvement and planning under the National Environmental Policy Act will occur prior to construction of a visitor education facility or other major facility.

### **Alternative B. Current Situation–2002**

The No Action alternative would favor existing, or status quo, refuge management and public outreach practices. Refuge staff would continue to restore and maintain existing wetland, grassland, forest and oak savanna habitats. New Refuge lands would be acquired to complete the current approved boundary. Biological controls and harvest methods would be used to control exotic plant or nuisance wildlife species. Current restrictions or prohibitions remain in place on canoeing, snowmobiling, horseback riding and off-trail biking. The environmental education program could see a new visitor education facility upriver but only minor improvements in existing exhibits and interpretive materials.

### **Alternative C. Balanced Public Use and Habitat Management (Preferred Alternative)**

The Service planning team has identified Alternative C, a balanced public use and habitat management approach, as the preferred alternative. Alternative C was selected and developed based on public input and the best judgement of the planning team. The strategies presented in the Draft CCP were developed as a direct result of the selection of Alternative C.

The preferred alternative would promote active management of existing habitats, higher quality recreational experiences for visitors and improved public outreach strategies. Refuge staff would continue to restore and maintain existing wetland, grassland and floodplain forest areas. Oak savanna habitats could receive new and intensive maintenance applications. New Refuge lands could be acquired up to a 50,000 acre maximum (see Minnesota River Valley Protection Proposal). The District's Waterfowl Production Area program would also expand as worthy sites are identified. Integrated biological controls and harvest methods would be used to control exotic plant or nuisance wildlife species. Horseback riding and the use of snowmobiles and mountain bikes would be limited to authorized segments of the Minnesota Valley State Trail. The environmental education program could see a new visitor education facility upriver with needed improvements in existing exhibits and interpretive materials. Additional staff, along with volunteers and interns, would be essential to implement an expanded public use program.

## Alternative D. Habitat Management Emphasis

Alternative D would emphasize the pro-active management of existing habitats. Available staff and discretionary funding would be applied to fish and wildlife habitat enhancements such as prescribed burning of grasslands and oak savannas, planting trees in converted bottomland forests and invasive plant control. The biological research and monitoring program would also receive more attention. In contrast to the expanding habitat work, new recreational opportunities for visitors would not be pursued and environmental education and outreach programs would remain at the year 2001 level or below.

Refuge staff would restore and maintain existing wetland, grassland and floodplain forest areas. Oak savanna habitats would receive intensive maintenance applications including hand cutting of woody plant invasives. New Refuge lands could be acquired up to a 100,000-acre maximum (see Minnesota River Valley Protection Proposal). The District's Waterfowl Production Area program would also expand as worthy sites are identified. Integrated biological controls and harvest methods would be used to control exotic plant or nuisance wildlife species. Horseback riding and the use of snowmobiles and mountain bikes would be limited to authorized segments of the Minnesota Valley State Trail. The environmental education program could see a new visitor education facility upriver but only minor improvements in existing exhibits and interpretive materials.

## Chapter 3 – Affected Environment

Minnesota Valley National Wildlife Refuge is located along 40 miles of the lower Minnesota River from Minneapolis, Minnesota, upstream to the town of Jordan, Minnesota. The Refuge, with a current approved boundary of 14,000 acres, was established by Congress in 1976. The Minnesota Valley Wetland Management District was established in 1994 and the 14-county District includes conservation easements and fee ownership of over 5,000 acres. The following section briefly describes the Minnesota River Valley downstream from the Cottonwood River at New Ulm to its confluence with the Mississippi River at Fort Snelling. More detail is included in Chapter 3 of the CCP.

*Lower Minnesota River:* Major vegetation community types found within the Refuge and the lower Minnesota River Valley include floodplain forest, upland forest, oak savanna and native prairie. The floodplain forests, which can flood in the spring or after a heavy rainfall, are dominated by water tolerant tree species such as silver maple, cottonwood and black willow. The upland forests consist of oak forest in well drained areas and maple-basswood forests in wetter sites such as ravines and moist terrace slopes. Existing oak savannas are primarily grazed pastures with scattered bur and northern pin oak trees. Remnant prairies, with a mix of warm season grasses and forbs, are generally found at sites along the river bluff (known locally as goat prairies) or are maintained on state and county park lands.

*Middle Minnesota River:* From the air, the midsection of the Minnesota River appears as a ribbon of green stretching through a vast patchwork of crop fields, roads and prairie settlements. The river corridor, at the historic juncture of the Northern Tallgrass Prairie and the Big Woods, still includes remnant prairies, deciduous upland forests, floodplain forests, oak savannas, and at least eight types of wetlands. Downstream from the City of



**Table 1: Summary of Management Alternatives for the Minnesota Valley National Wildlife Refuge and Wetland District.**

<b>Issues</b>	<b>Alternative A Public Use Emphasis</b>	<b>Alternative B Current Situation</b>	<b>Alternative C Balanced Public Use and Habitat Management (Preferred Alternative)</b>	<b>Alternative D Habitat Management Emphasis</b>
<b><i>Habitat</i></b>				
<i>Wetlands</i>	No active management.	Mitigative management.	Manage intensively with new water control structures	Same as Alt. 3.
<i>Grasslands / Oak Savanna</i>	No active management.	Restoration and management (hydro-ax and burn).	Prairie eco-type planting scheme and intensive management.	Restoration with component of native trees, shrubs and forbs.
<i>Floodplain Forest</i>	No active management.	Natural regeneration.	Intensive restoration (plant trees).	Intensive restoration with full complement of native trees and shrubs.
<i>Upland Forest</i>	No active management.	Natural regeneration.	Intensive restoration (tree planting).	Intensive restoration with full complement of native trees and shrubs.
<b><i>Fish, Wildlife and Plants</i></b>				
<i>Exotic Plant Species</i>	No control measures.	Limited control (2 species), minimal biological control.	Control of target species and integrated biological control.	Full control of all species and integrated biological control.
<i>Nuisance Wildlife Control</i>	Reactive control and public education.	Proactive control (i.e. deer hunts and beaver control).	Same as Alt. 2.	Same as Alt. 2, but consider adding species to active control list.
<i>Critical Migratory Bird Nesting Areas</i>	Enforce minimum legal protection.	Limited access and protection (some nesting areas not closed).	Minimum level of protection as stated under MnDNR guidelines (case-by-case).	Maximum level of protection as stated under MnDNR guidelines.
<i>Endangered and Threatened Species (Federal)</i>	Possible limited disturbance of Bald Eagle nests.	Limited closures to protect Bald Eagle nests.	Limited closures to protect Bald Eagle nests.	Increased closures to protect Bald Eagle nests.

**Table 1: Summary of Management Alternatives for the Minnesota Valley National Wildlife Refuge and Wetland District (Continued)**

<b>Issues</b>	<b>Alternative A Public Use Emphasis</b>	<b>Alternative B Current Situation</b>	<b>Alternative C Balanced Public Use and Habitat Management (Preferred Alternative)</b>	<b>Alternative D Habitat Management Emphasis</b>
<b><i>Recreation</i></b>				
<i>Hunting</i>	Allow on all refuge units upstream of of I-35W consistent with state regulations.	Allow within select units/areas (identified in hunting brochure).	Hunting program designed to improve quality (limited permits system).	Significantly decrease hunting on refuge.
<i>Fishing (Minnesota River, side-channels and Refuge lakes)</i>	Open to all fishing (non-motorized boats only). Improved or new boat and shore-line access.	Bank fishing only on Minnesota River.	Improve quality of fishing and access with active management (i.e., Long Meadow and Chaska lakes.	Bank fishing with seasonal closures near sensitive wildlife habitats.
<i>Recreational Trail System</i>	Complete trails as proposed in 1984 Master Plan	Same as Alt. 1 plus maintain existing trails.	Partner with DNR to help complete State Trail. Possible trail development for all refuge units. Provide trail maps.	Same as Alt. 2
<b><i>Secondary Recreational Uses</i></b>				
<i>Bicycling</i>	Allowed on State Trail and existing refuge trails.	Allowed on State Trail and existing refuge trails.	Limited access routes to State Trail and designated refuge trails.	Allowed on State Trail only.
<i>Horseback Riding</i>	State Trail, Fisher Lake, Rice Lake and Blue (unregulated).	State Trail, Fisher Lake, Rice Lake and Blue (unregulated).	Allowed on State Trail and across limited access routes.	Same as Alt. 3
<i>Canoeing (excluding Minnesota River, non-motorized only)</i>	Unregulated (will be allowed on all Refuge waters).	No canoeing.	Increase in canoe trip interpretive programs.	No canoeing.
<b><i>Resource Threats</i></b>				
<i>Storm water, spills and persistent contaminants</i>	No action.	Reactive actions only with minimal monitoring.	Proactive, work with cities and include routine monitoring.	Same as Alt. 3.
<i>Land use and development adjacent to Refuge</i>	No action.	React to immediate threats to Refuge resources.	Proactive. Work with partners and decision-makers.	Same as Alt. 3.

**Table 1: Summary of Management Alternatives for the Minnesota Valley National Wildlife Refuge and Wetland District (Continued)**

<b>Issues</b>	<b>Alternative A Public Use Emphasis</b>	<b>Alternative B Current Situation</b>	<b>Alternative C Balanced Public Use and Habitat Management (Preferred Alternative)</b>	<b>Alternative D Habitat Management Emphasis</b>
<b><i>Land Protection</i></b>				
<i>Land Protection: Wetland Management District</i>	No new WPA acquisitions.	Average 500-1,000 acres per year in fee and easements.	Acquire up to 10,000 acres (approximately 750 acres per year).	Acquire 25,000 acres in total.
<i>Land Protection: Existing Refuge and Beyond</i>	No or limited acquisitions. Only manage lands within existing Refuge boundary.	Acquire and manage lands only within existing Refuge boundary (14,000 acres total).	Add up to 36,000 acres to Refuge (50,000-acre boundary maximum).	Protect up to 100,000 acres up-river based on 1994 Citizens Advisory Committee recommendations.
<b><i>Environmental Education</i></b>				
<i>Need for New Facilities</i>	Add visitor education facility, possibly at Chaska, Rapids Lake, or Louisville.	Add visitor education facility, possibly at Chaska, Rapids Lake, or Louisville.	Add visitor education facility, possibly at Chaska, Rapids Lake, or Louisville.	Decrease effort directed toward public education and use of Refuge.
<i>Underused Existing Facilities and Interpretive Media</i>	Improve outreach media and interpretive materials.	No change in quality and quantity of outreach efforts.	Same as Alt. 1.	Decrease effort directed toward public education and use of Refuge.
<i>Outdated Exhibits</i>	Replace and actively maintain exhibits. Create a multi-purpose room.	Minimal maintenance with occasional improvements.	Replace and actively maintain exhibits. Create a multi-purpose room.	Minimal maintenance with occasional improvements.
<i>Low Public Awareness of Refuge and Protection Goals</i>	Increase in staffing. Explore new techniques for outreach and enforcement.	No increase in outreach or law enforcement.	Increase in staffing. Explore new techniques for outreach and enforcement.	No increase in outreach or law enforcement.

New Ulm, numerous small streams and several major tributaries, including the Le Sueur, Blue Earth and Cottonwood Rivers enter the Minnesota River. These rivers flow slowly as the range of elevations in the Minnesota River Valley and surrounding uplands, some of the lowest in the State, varies only from 600 to 800 feet.

More than 260 species of birds use the area during migration and 100-150 of these species nest in the Minnesota River Watershed. Bald Eagles use the area for nesting and feeding each spring and fall. Every year, 30,000-40,000 waterfowl congregate in the lower portion of the Minnesota River Valley prior to fall migration. This avian diversity is complemented by approximately 50 species of mammals and 30 species of reptiles and amphibians. At least 10 game fish species are found in the river and tributaries including walleye, sauger, largemouth bass and channel catfish.

**Threatened and Endangered Species:** Two federally listed (Bald Eagle and Piping Plover) and two state-listed (Loggerhead Shrike and Common Tern) endangered or threatened bird species use the Minnesota River Valley during part of their life cycle. Blanding's turtle, a state-listed reptile, is also found in suitable habitat.

**Archeological and Cultural Values:** Archeological records show evidence of the presence of all cultural periods from the retreat of the glaciers to the present day on the Refuge and the District. Known and potential sites include prehistoric isolated finds, camps, villages, subsistence and procurement stations, quarries, and mounds and human burials; and post contact (Western culture) Indian villages, trading posts, homesteads, farmsteads (buildings and land), other rural buildings and structures, cemeteries, trails, roads, and railroads, ferries, conservation projects, drainage ditches, open pit mines (e.g., gravel), sacred sites, cultural hunting and gathering areas, and battlefields.

To date, archeological investigations have covered about 1,500 acres of Refuge and District land. Through these studies and from other sources, 80 cultural resource sites have been identified. Most Refuge and District lands are in close association with larger bodies of water and permanent streams, the same landforms that appear to have been preferred by prehistoric inhabitants as well as more recent settlers. The number of reported sites is expect to be a small fraction of the total number of sites actually present on Service land.

## Chapter 4 – Environmental Consequences

### Effects Common to all Alternatives

Specific environmental and social impacts of implementing each alternative are examined in the seven broad issue categories; habitat, fish/wildlife/plants, recreation, secondary recreational uses, resource threats, land protection and environmental education. However, a few potential effects will be the same under each alternative and are summarized below:

*Air and Water Quality:* Habitat management involving prescribed burning may occur and only under ideal conditions of weather. Smoke management practices will be implemented during all burning events. Refuge management activities and visitor use should not negatively affect water quality. Future land acquisition in erosion-prone areas and encouraging municipal stormwater treatments will improve water quality in the Minnesota River and tributaries.

*Cultural Resources:* The U.S. Fish and Wildlife Service is responsible for managing archeological and historic sites found on federal land. At the start of the CCP planning process, the Service contracted with U.S. West Research, Inc. to produce a Cultural Resource Management Plan for the Refuge and the District's Waterfowl Production Areas (Godfrey 1999). The three volume plan was delivered in June 1999. There are 77 known historical sites located on Service lands. Sites include ferry/steamboat landings, farmsteads, trading posts, bridges, townsites, etc. Many sites have not been evaluated regarding their eligibility for the National Register of Historic Places. However, at least 24 sites have been determined to be ineligible.

The Cultural Resource Management Plan will be used by Refuge managers to ensure compliance with relevant federal, tribal, state and local laws and regulations. Prior to all habitat and facility maintenance activities, appropriate efforts will be made to identify known and possible cultural resources within the area of potential impact. Avoidance of cultural resources would be the preferred treatment.

*Environmental Justice:* Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" was signed by President Clinton on February 11, 1994, to focus Federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed Federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in Federal programs substantially affecting human health and the environment, and to provide minority and low-income communities access to public information and participation in matters relating to human health or the environment.

None of the management alternatives described in this EA will disproportionately place any adverse environmental, economic, social, or health impacts on minority and low-income populations. Implementation of any action alternative that includes public use and environmental education will actually provide a benefit to urban residents living in the Twin Cities Metro Area.

*Climate Change Impacts:* The U.S. Department of the Interior issued an order in January 2001 requiring federal agencies under its direction that have land management responsibilities to consider potential climate change impacts as part of long range planning endeavors.

The increase of carbon within the earth's atmosphere has been linked to the gradual rise in surface temperature commonly referred to as global warming. In relation to comprehensive conservation planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy's "*Carbon Sequestration Research and Development*" (U.S. DOE, 1999) defines carbon sequestration as "...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

The land is a tremendous force in carbon sequestration. Terrestrial biomes of all sorts – grasslands, forests, wetlands, tundra, perpetual ice and desert – are effective both in preventing carbon emission and acting as a biological "scrubber" of atmospheric carbon

monoxide. The Department of Energy report's conclusions noted that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere.

Preserving natural habitat for wildlife is the heart of any long range plan for national wildlife refuges. The actions proposed in this Comprehensive Conservation Plan would preserve or restore land and water, and would thus enhance carbon sequestration. This in turn contributes positively to efforts to mitigate human-induced global climate changes.

## **Summary of Effects by Alternative**

The following section describes the environmental consequences of adopting each refuge management alternative. Table 2 (page 116) addresses the likely outcomes for specific issues and is organized by broad issue categories.

### Alternative A: Public Use Emphasis

This alternative would emphasize recreational uses and environmental education while maintaining a low maintenance approach to managing habitats. Staff time and resources would be shifted to allow for more public activities in all areas of the refuge. Wetlands, grasslands or oak savannas would not be actively restored on existing refuge lands. No land for Refuge units would be acquired outside of the current boundaries. Hillside forests and goat prairies adjacent to the refuge would continue to be lost due to subdivision and housing developments.

Control of exotic plants or nuisance wildlife populations would be kept to a minimal and reactive level. Purple loosestrife would continue to pioneer into new areas with a resultant loss in wetland value for wildlife. However, the deer herd could be controlled through public hunting that would be expanded to new areas under this alternative.

Secondary recreational uses such as horseback riding and mountain biking would be allowed on existing trails. However, no new areas would be opened to these uses. The environmental education program could see a new visitor education facility, exhibits and interpretive materials. Additional staff and/or volunteers would be added in an effort to increase on-site public contacts throughout the Refuge.

### Alternative B: The Current Situation

Existing refuge management and public outreach practices would be favored under this alternative. Refuge staff would continue to restore and maintain existing wetland, grassland, forest and oak savanna habitats. Land would be acquired to complete the current approved boundary of 14,000 acres. Approximately 500-1,000 acres of habitat in Waterfowl Production Areas would be added within the District each year.

Current restrictions or prohibitions remain in place on canoeing, snowmobiling, horseback riding and off-trail biking. A new visitor education facility would be constructed upriver using Trust funds. Minor improvements would occur for existing exhibits and interpretive materials.

The Current Refuge and District Program portion within Chapter 4 of the CCP contains more detail about the current situation.

#### Alternative C: Balanced Public Use and Habitat Management (Preferred Alternative)

The preferred alternative would promote active management of existing fish, wildlife and plant habitats and higher quality recreational experiences for visitors. Refuge staff would continue to restore and maintain existing and new wetland, grassland and floodplain forest areas. Oak savanna habitats could receive new and intensive maintenance applications. Forest restoration would include active strategies such as planting trees and protecting them from browsing damage. Integrated biological controls and harvest methods would be used to control exotic plant or nuisance wildlife species.

New Refuge lands could be acquired up to a 50,000 acre maximum (see Minnesota River Valley Protection Proposal). The District's Waterfowl Production Area inventory would also expand an additional 10,000 acres as worthy sites are identified.

Horseback riding and mountain bike use would be limited to authorized segments of the Minnesota Valley State Trail. The environmental education program would see a new visitor education facility upriver. Some improvements in existing exhibits and interpretive materials would also occur. New public outreach strategies would result in greater public understanding and advocacy for Refuge and District resources.

#### Alternative D: Habitat Management Emphasis

Alternative D emphasizes the active management of existing fish, wildlife and plant habitats. Available staff and discretionary funding would be applied to habitat enhancements such as prescribed burning of grasslands and oak savannas, tree plantings in converted bottomland forests and invasive plant control. The biological research and monitoring program would also receive more attention.

Refuge staff would restore and maintain existing wetland, grassland and floodplain forest areas. Oak savanna habitats would receive new and intensive maintenance applications. New Refuge lands could be acquired up to a 100,000 acre maximum (see Minnesota River Valley Protection Proposal). The District's Waterfowl Production Area program would expand to 25,000 acres. Integrated biological controls and harvest methods would be used to control exotic plant or nuisance wildlife species.

In contrast to the expanding habitat work, new recreational opportunities for visitors would not be pursued and environmental education and outreach programs would remain at the year 2001 level or below. Horseback riding and the use of mountain bikes would be limited to authorized segments of the Minnesota Valley State Trail. The environmental education program could see a new visitor education facility upriver but only minor improvements in existing exhibits and interpretive materials. A slight increase in public awareness of the Refuge and District is expected due to land protection efforts and the new visitor facility.

**Table 2: Summary of Environmental Consequences for Management Alternatives for the Minnesota Valley National Wildlife Refuge and Wetland Management District**

<b>Issues</b>	<b>Alternative A Public Use Emphasis</b>	<b>Alternative B Current Situation</b>	<b>Alternative C Balanced Public Use and Habitat Management (Preferred Alternative)</b>	<b>Alternative D Habitat Management Emphasis</b>
<b><i>Habitat</i></b>				
<i>Wetlands</i>	Decreased. No active management.	Slight increase. Mitigative management.	Increased. New water control structures.	Same as Alt. C.
<i>Grasslands / Oak Savanna</i>	Decreased. No active management.	Increased through restoration and active management.	Increased through planting and intensive management.	Increased through restoration of native trees, shrubs and forbs.
<i>Floodplain Forest</i>	Decreased. No active management.	Increased through natural regeneration.	Increased through intensive restoration (plant trees).	Increased by restoration with full complement of native trees and shrubs.
<i>Upland Forest</i>	Decreased. No active management.	Increased through natural regeneration.	Increased through intensive restoration (tree planting).	Increased by intensive restoration with native trees and shrubs.
<b><i>Fish, Wildlife and Plants</i></b>				
<i>Exotic Plant Species</i>	Loss of habitat due to lack of control measures.	Loss of habitat due to limited control measures.	Slight gain of habitat due to target species and integrated biological control.	Gain of habitat due to full control of all species and integrated biological control.
<i>Nuisance Wildlife</i>	Stable to increased populations due to reactive control and public education.	Stable to decreased populations due to proactive control.	Same as Alt. B.	Same as Alt. B, but consider adding species to control list.
<i>Critical Migratory Bird Nesting Areas (Bald Eagle, Herons)</i>	Increase in disturbance. Enforce minimum legal protections.	Limited disturbance through limited access and some area closures.	Limited disturbance through minimum level of protection as stated under MnDNR guidelines.	Decreased disturbance through maximum level of protection as stated under MnDNR guidelines.
<i>Endangered and Threatened Species (Federal)</i>	Stable to increased disturbance of Bald Eagle nests.	Stable. Limited closures to protect Bald Eagle nests.	Stable. Limited closures to protect Bald Eagle nests.	Reduced disturbance through more area closures around Bald Eagle nests.



**Table 2 (Continued): Summary of Environmental Consequences for Management Alternatives for the Minnesota Valley National Wildlife Refuge and Wetland Management District**

<b>Issues</b>	<b>Alternative A Public Use Emphasis</b>	<b>Alternative B Current Situation</b>	<b>Alternative C Balanced Public Use and Habitat Management (Preferred Alternative)</b>	<b>Alternative D Habitat Management Emphasis</b>
<b><i>Recreation</i></b>				
<i>Hunting</i>	Increased. Allow on all Refuge units up-stream of I-35W consistent with State regulations.	Stable. Allow within select units/areas (identified in hunting brochure).	Stable. Same as Alt. B except that program will be designed to improve quality of experience.	Stable to decreased hunting opportunities.
<i>Fishing (Minnesota River, side-channels and Refuge lakes)</i>	Increased. Open to all fishing (non-motorized boats only). Improved or new boat and shore-line access.	Stable. Bank fishing only on Minnesota River.	Increased. Improved quality of fishing and access.	Decreased. Bank fishing with seasonal closures near sensitive wildlife habitats.
<i>Recreational Trail System</i>	Increased. Complete trails as proposed in 1984 Master Plan.	Same as Alt. A, plus maintain existing trails.	Increased. Partner with DNR to help complete State Trail. Possible trail development for most Refuge units.	Same as Alt. A with less emphasis on maintaining existing trails.
<b><i>Secondary Recreational Uses</i></b>				
<i>Bicycling</i>	Stable to increased. Allowed on State Trail and existing Refuge trails.	Same as Alt. A.	Stable to decreased. Decreased. Allowed Limited access routes to State Trail and designated Refuge trails.	Allowed on State Trail only.
<i>Horseback Riding</i>	Limited to State Trail, Fisher Lake, Rice Lake and Blue (unregulated).	Same as Alt. A.	Decreased. Allowed on State Trail and across limited access routes only.	Same as Alt. C.
<i>Canoeing (Excluding Minnesota River; non-motorized only)</i>	Increased. Would be allowed on all Refuge waters.	No canoeing.	Increased. More interpretive canoe trips.	Same as Alt. B.
<b><i>Resource Threats</i></b>				
<i>Storm Water, Spills and Persistent Contaminants</i>	No action.	Stable protection. Reactive actions only with minimal monitoring.	Increased protection due to proactive work with cities and routine monitoring.	Same as Alt. C.
<i>Land Use and Development Adjacent to Refuge</i>	No action.	Stable protection, reaction to immediate threats to Refuge resources.	Increased protection due to more work with partners and decision-makers.	Same as Alt. C.

**Table 2 (Continued): Summary of Environmental Consequences for Management Alternatives for the Minnesota Valley National Wildlife Refuge and Wetland Management District**

<b>Issues</b>	<b>Alternative A Public Use Emphasis</b>	<b>Alternative B Current Situation</b>	<b>Alternative C Balanced Public Use and Habitat Management (Preferred Alternative)</b>	<b>Alternative D Habitat Management Emphasis</b>
<b><i>Land Protection</i></b>				
<i>Land Protection: Wetland District</i>	Decreased. No new WPA acquisitions.	Slight increase. Average 500-1,000 acres per year in fee and easements.	Increased. Acquire up to 10,000 acres (~ 750 acres per year).	Increased. Acquire 25,000 acres in total.
<i>Land Protection: Existing Refuge and Beyond</i>	Decreased. No or limited acquisitions. Only manage lands within existing Refuge boundary.	Stable. Acquire and manage lands only within existing Refuge boundary.	Increased. Add up to 36,000 acres to Refuge.	Increased. Protect from 50,000 to 100,000 acres.
<b><i>Environmental Education</i></b>				
<i>Public Use Facilities</i>	Increased. Add visitor education facility or facilities.	Same as Alt. A.	Same as Alt. A.	Decreased. Less effort directed toward outreach and use of Refuge.
<i>Quality of Interpretive Media</i>	Increased. Improved outreach media and materials.	Stable. No change in quality and quantity of outreach efforts.	Same as Alt. A.	Decreased. Less effort directed toward education.
<i>Quality of of Exhibits</i>	Increased. Replace and actively maintain exhibits. Create a multi-purpose room.	Slight increase. Occasional improvements.	Increased. Replace and actively maintain exhibits. Create a multi-purpose room.	Same as Alt. B.
<i>Public Awareness of Refuge and Resource Protection Goals</i>	Increased. More staff and new techniques for outreach and enforcement.	Stable. No increase in outreach or law enforcement.	Same as Alt. A.	Same as Alt. B.

## **Chapter 5 - List of Preparers**

Please see Appendix K

## **Chapter 6 - Consultation and Coordination With the Public and Others**

The Minnesota Valley NWR Comprehensive Conservation Plan and Environmental Assessment has been written with the participation of Service staff, Refuge users and the local community. The CCP planning process began in October 1998 with the formation of a refuge planning team. Subsequently, the planning team hosted a series of open houses in communities along the river. Individuals from state agencies, non-profit organizations, and others were invited to join one of five small discussion groups. Each group dealt with a certain topic; refuge management and biology, environmental education and interpretation, threats and conflicts, and refuge expansion and watershed activities. The recommendations from these working groups provided valuable information for the authors of this plan. Please see Chapter 2 of the CCP for more information on the public scoping process.

## **Chapter 7 - References and Literature Cited**

Please see Appendix H